

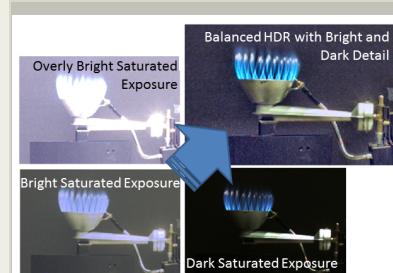
Color-XHDR - A Compact High-Speed Color Extreme High Dynamic Range Video Capability for Rocket Engine Testing, Phase I

Completed Technology Project (2016 - 2016)



Project Introduction

Innovative Imaging and Research (I2R) proposes to develop a 21st Century high-speed, color extreme high dynamic range (Color-XHDR) video recording system that will produce calibrated, engineering-grade video to accurately document rocket motor firings, at close range within a test cell, without image saturation. This novel imaging system will include a compact, single camera/single focal plane array camera and end-to-end image processing software to produce, high quality, low noise, high-speed video not currently possible with today's technology. The compact cameras will be compatible with existing SSC camera housing, as all acquired imagery will be stored off-camera to prevent loss of information in the event of a mishap. The system will be able to record entire test sequences at 250 fps lasting up to 45 minutes. Most importantly, the system will produce XHDR (>120 dB dynamic range) HD format imagery so that relatively dark test cell infrastructure and test article hardware will be visible alongside exhaust plumes that may also contain hot molten debris with brightness levels approaching that of the sun. Because the imagery will be calibrated, the system will also provide engineering information such as color temperature and particle trajectory velocities. Geometric calibration will enable multiple properly positioned cameras to provide accurate 3-D XHDR image products. Rocket engine certification ground testing requires clear visual high-speed video recording that can capture essential information for NASA during rocket engine certification ground testing. This need is particularly true in the event of a mishap, when investigations into the underlying cause ensue. The cameras in use today at SSC have significant limitations including plume saturation, rolling shutter image wobble, camera geometric distortion, and no off-board storage, which makes it nearly impossible, in catastrophic situations that result in the loss of a camera, to obtain critical information.



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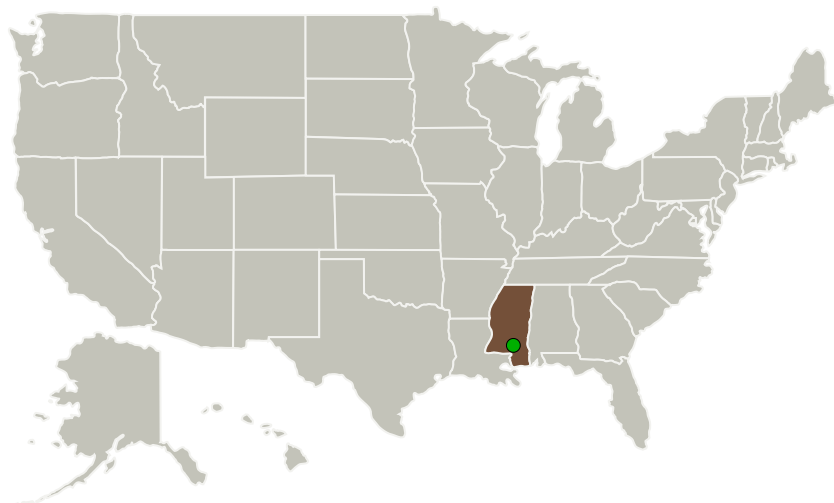
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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Innovative Imaging and Research Corporation	Lead Organization	Industry Women-Owned Small Business (WOSB)	Stennis Space Center, Mississippi
● Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi

Primary U.S. Work Locations

Mississippi

Project Transitions

June 2016: Project Start

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Innovative Imaging and Research Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

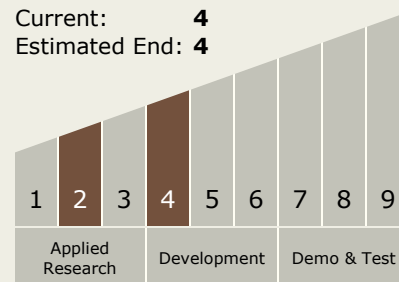
Robert E Ryan

Technology Maturity (TRL)

Start: 2

Current: 4

Estimated End: 4



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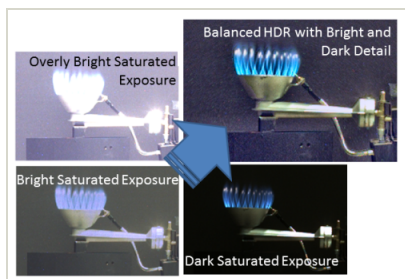


✓ **December 2016:** Closed out

Closeout Documentation:

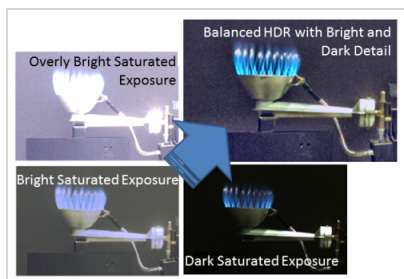
- Final Summary Chart(<https://techport.nasa.gov/file/139950>)

Images



Briefing Chart Image

Color-XHDR - A Compact High-Speed Color Extreme High Dynamic Range Video Capability for Rocket Engine Testing, Phase I
(<https://techport.nasa.gov/image/127436>)



Final Summary Chart Image

Color-XHDR - A Compact High-Speed Color Extreme High Dynamic Range Video Capability for Rocket Engine Testing, Phase I Project Image
(<https://techport.nasa.gov/image/137145>)

Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
 - └ TX13.1 Infrastructure Optimization
 - └ TX13.1.5 Ground and Surface Logistics

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System